AMENDMENTS TO THE CLAIMS

1.   (Currently Amended) Method of evaluating a physical quantity associated with an interaction between a wave and an obstacle, in a region of three-dimensional space, [in which] *wherein*:

a)   a plurality of surface samples (dS_i), of which a part at least represents the surface of an obstacle receiving a main wave and emitting, in response, a secondary wave, is determined by meshing, and at least one source (S_i) emitting an elementary wave representing a contribution to [the] said secondary wave is allocated to each surface sample,

b)   a matrix system is formed, comprising:

-       an invertible interaction matrix ($F(M)$), applied to a given region (M) of space and comprising a number of columns corresponding to a total number of sources,

-       a first column matrix, each coefficient (v_i) of which is associated with a source (S_i) and characterizes the elementary wave that it emits,

-       and a second column matrix, which is obtained by multiplication of the first column matrix by the interaction matrix and the coefficients of which are values of a physical quantity ($V(M)$) representative of the wave emitted by the set of sources in [the] said given region (M),

c)   to estimate the coefficients of the first column matrix (v_i), chosen values of physical quantity ($V(P_i)$) are assigned to predetermined points (P_i), each associated with a surface sample (dS_i), [the] said chosen values ($V(P_i)$) being placed in the second column matrix, and this second column matrix is multiplied by the inverse of the interaction matrix applied to [the] said predetermined points (P_i),

d)   to evaluate [the] said physical quantity (V(M)) representing the wave

emitted by the set of sources in a given region (M) of three-dimensional space, the interaction

matrix is applied to [the] said given region (M) and this interaction matrix is multiplied by the

first column matrix comprising the coefficients estimated in step c).

2.   (Currently Amended) Method according to Claim 1, [in which] _wherein_,

to evaluate a physical quantity representative of an interaction between an element radiating a

main wave and an obstacle receiving this main wave,

-      in step a), a plurality of surface samples (dS'$_i$) together representing an

active surface of the element radiating the main wave is furthermore determined, by meshing,

and at least one source (S'$_i$) emitting an elementary wave representing a contribution to [the]

said main wave is allocated to each sample of the active surface,

-      steps b), c) and d) are furthermore applied to the samples of the active

surface, and

-      [the] said physical quantity (V(M)) representing the interaction between

the radiating element and the obstacle in a given region (M) of three-dimensional space is

evaluated by taking account of the contribution, in [the] said given region (M), of the main

wave emitted by the set of sources of the active surface and the contribution of the secondary

wave emitted by the set of sources of the surface of the obstacles.

3.   (Currently Amended) Method according to [one of] Claim[s] 1 [and 2],

[in which] _wherein_ each coefficient of the interaction matrix, applied to a given region of space,

is representative of an interaction between a source and [the] said given region and the value of

each coefficient is dependent on a distance between a source and [the] said given region.

4.   (Currently Amended) Method according to [one of] Claim[s] 1 [to 3], [in which] _wherein_ the interaction matrix applied, in step c), to [the] said predetermined points (P_i) comprises a number of rows corresponding to a total number of predetermined points (P_i).

5.   (Currently Amended) Method according to [one of] Claim[s] 1 [to 4], [in which] _wherein_ the physical quantity to be evaluated is a scalar quantity $(V(P_i))$ and, in step a), a single source is allocated to each surface sample.

6.   (Currently Amended) Method according to Claim 5, [in which] _wherein_ the interaction matrix $(F(M))$ applied, in step d), to a region of space (M) comprises a row.

7.   (Currently Amended) Method according to [one of] Claim[s] 5 [and 6], [in which] _wherein_ each predetermined point (P_i) associated with a surface sample (dS_i) corresponds to a point of contact between this surface sample (dS_i) and a hemisphere whose surface is equal to the surface of this surface sample, and whose centre corresponds to a position of the source (S_i) which is allocated to this surface sample.

8.   (Currently Amended) Method according to [one of] Claim[s] 5 [to 7], [in which] _wherein_:

        -       the main wave is an electric wave,

        -       the coefficients of the first column matrix are values of electric charge that are each associated with a source, and

        -       the coefficients of the second column matrix are values of electric potential.

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9.   (Currently Amended) Method according to [one of] Claim[s] 5 [to 7], [in which] _wherein_:

-    the main wave is a magnetic wave,

-    the coefficients of the first column matrix are values of magnetic flux that are each associated with a source, and

-    the coefficients of the second column matrix are values of magnetic potential.

10.   (Currently Amended) Method according to [one of] Claim[s] 5 [to 7], [in which] _wherein_:

-    the main wave is a sound wave,

-    the coefficients of the first column matrix are values of speed of sound that are each associated with a source, and

-    the coefficients of the second column matrix are values of acoustic pressure.

11.   (Currently Amended) Method according to [one of] Claim[s] 1 [to 4], [in which] _wherein_ the physical quantity to be evaluated is a vector quantity ($\underline{V}(P_i)$) expressed by its three coordinates in three-dimensional space, and three sources (SA_i, SB_i, SC_i) are allocated, in step a), to each surface sample (dSi).

12.   (Currently Amended) Method according to Claim 11, [in which] _wherein_ the interaction matrix ($F_{\underline{v}}(M)$) applied, in step d), to a region of space (M) comprises a row for each space coordinate (X, Y, Z).

13. (Currently Amended) Method according to [one of] Claim[s] 11 [and 12], [in which] *wherein*:

- the three sources allocated to each surface sample are substantially in one and the same plane, and

- each predetermined point (P_i) associated with a surface sample (dS_i) corresponds to a point of contact between this sample and a hemisphere whose surface is equal to the surface of this sample, and whose centre corresponds to the position of a barycentre of the three sources.

14. (Currently Amended) Method according to Claim 13, [in which] *wherein* the three sources of one and the same surface sample form substantially an equilateral triangle, and the triangles of the surface samples are oriented substantially randomly with respect to one another.

15. (Currently Amended) Method according to [one of] Claim[s] 11 [to 14], [in which] *wherein*:

- the main wave is an electric wave,

- the coefficients of the first column matrix are values of electric charge that are each associated with a source, and

- the coefficients of the second column matrix are values of coordinates of an electric field.

16. (Currently Amended) Method according to [one of] Claim[s] 11 [to 14], [in which] *wherein*:

- the main wave is a magnetic wave,

- the coefficients of the first column matrix are values of magnetic flux

that are each associated with a source, and

- the coefficients of the second column matrix are values of coordinates of

a magnetic field.

17. (Currently Amended) Method according to [one of] Claim[s] 11 [to 14], [in which] *wherein*:

- the main wave is a sound wave,

- the coefficients of the first column matrix are values of speed of sound

that are each associated with a source, and

- the coefficients of the second column matrix are values of coordinates of

an acoustic velocity.

18. (Currently Amended) Method according to [one of the preceding] claim[s] 1, [in which] *wherein*, to estimate the contribution of the secondary wave in [the] said given region in step d), [the] said values of physical quantity ($V(P_i)$) chosen in step c) are dependent on a predetermined coefficient of reflection and/or of transmission of the main wave by each surface sample of the obstacle.

19. (Currently Amended) Method according to Claim 18, taken in combination with [one of] Claim[s] 6 [and 12], [in which] *wherein* the secondary wave corresponds to a reflection of the main wave on the obstacle and the hemisphere is oriented outwards from the obstacle.

20.   (Currently Amended) Method according to Claim 18, taken in combination with [one of] Claim[s] 6 [and 12], [in which] _wherein_ the secondary wave corresponds to a transmission of the main wave in the obstacle and the hemisphere is oriented inwards into the obstacle.

21.   (Currently Amended) Method according to [one of] Claim[s] 19 [and 20], [in which] _wherein_, in step c), the values (v'_i) associated with the sources (S'_i) of the radiating element (ER) are determined and at least the following are formulated:

     -      a first interaction matrix ($F(P)$) representing the contribution of the sources of the obstacle to the predetermined points of the surface of the obstacle (P_i),

     -      a second interaction matrix ($F'(P)$) representing the contribution of the sources of the radiating element to the predetermined points of the surface of the obstacle (P_i),

     -      a reflection (R) or transmission (T) matrix, whose coefficients represent coefficients of reflection or of transmission at each predetermined point (P_i) of the obstacle,

     to determine the values of the sources of the obstacle (v_i) as a function of the values of the sources of the radiating element (v'_i) and of a multiplication of the first and second interaction matrices and of the reflection or transmission matrix.

22.   (Currently Amended) Method according to Claim 21, [in which] _wherein_, in step c), the values (v'_i) associated with the sources (S'_i) of the radiating element (ER) are determined by taking account of the reception of the secondary wave by the radiating element (ER) and by furthermore formulating:

     -      a third interaction matrix ($F(P')$) representing the contribution of the sources of the obstacle to the predetermined points of the surface of the radiating element (P'_i),

-       and a fourth interaction matrix (F'(P')) representing the contribution of the sources of the radiating element to the predetermined points of the surface of the radiating element (P'$_i$).

23.   (Currently Amended) Method according [one of] Claim[s] 19 [to 22], [in which] _wherein_ the surface of the obstacle corresponds to an interface between two distinct media of a heterostructure.

24.   (Currently Amended) Method according to [one of the preceding] Claim[s] $\underline{1}$, [in which] _wherein_ the main wave is a sound wave and the coefficients of the interaction matrix are each dependent on an angle of incidence of an elementary wave emanating from a source in [the] said given region (M).

25.   (Currently Amended) Method according to [one of] Claim[s] 7 [and 13], [in which] _wherein_, for each surface sample, the value is tested of a scalar product of:

-       a first vector ($\vec{r}$)normal to the surface sample and directed towards the apex (P) of the hemisphere (Fig. 7A), and

-       a second vector ($\overrightarrow{SM}$) drawn between a source (S) associated with this hemisphere and [the] said given region (M),

        while distinguishing:

-       the case where this scalar product is less than a predetermined threshold and the contribution of this source is not taken into account, and

-       the case where this scalar product is greater than a predetermined threshold and the contribution of this source is actually taken into account.

26.   (Currently Amended) Method according to [one of the preceding]
Claim[s] *1*, [in which] *wherein* the main wave is a sound wave and, in step a), a total number of
surface samples (dS_i) is chosen substantially as a function of a wavelength of the sound wave
so as to satisfy the Rayleigh criterion.

27.   (Currently Amended) Method according to [one of the preceding]
Claim[s] *1*, [in which] *wherein* a plurality of values of the physical quantity estimated in step
d), which are obtained for a plurality of regions of space, are compared so as to select a
candidate region for the placement of a radiating element intended to interact with the obstacle.

28.   (Currently Amended) Method according to [one of] Claim[s] 2 [to 27],
[in which] *wherein* the radiating element is a sensor, for nondestructive testing, intended for
analysing an object forming an obstacle of the main wave.

29.   (Currently Amended) Computer program product, stored in a central
unit memory or on a removable support able to cooperate with a reader of this central unit,
[characterized in that] *wherein* it comprises instructions for implementing [tho] *a* method
[according to one of the preceding claims] *of evaluating a physical quantity associated with an*
interaction between a wave and an obstacle, in a region of three-dimensional space, wherein:

a)   *a plurality of surface samples (dS_i), of which a part at least represents*
the surface of an obstacle receiving a main wave and emitting, in response, a secondary wave,
is determined by meshing, and at least one source (S_i) emitting an elementary wave
representing a contribution to [the] said secondary wave is allocated to each surface sample,

b)   *a matrix system is formed, comprising:*

-   an invertible interaction matrix (F(M)), applied to a given region (M) of space and comprising a number of columns corresponding to a total number of sources,

-   a first column matrix, each coefficient (v_i) of which is associated with a source (S_i) and characterizes the elementary wave that it emits,

-   and a second column matrix, which is obtained by multiplication of the first column matrix by the interaction matrix and the coefficients of which are values of a physical quantity (V(M)) representative of the wave emitted by the set of sources in [the] said given region (M),

c)   to estimate the coefficients of the first column matrix (v_i), chosen values of physical quantity ($V(P_i)$) are assigned to predetermined points (P_i), each associated with a surface sample (dS_i), [the] said chosen values ($V(P_i)$) being placed in the second column matrix, and this second column matrix is multiplied by the inverse of the interaction matrix applied to [the] said predetermined points (P_i),

d)   to evaluate [the] said physical quantity (V(M)) representing the wave emitted by the set of sources in a given region (M) of three-dimensional space, the interaction matrix is applied to [the] said given region (M) and this interaction matrix is multiplied by the first column matrix comprising the coefficients estimated in step c).